OPENSOURCE GEOSPATIAL PLANNING TOOLS FOR RURAL ELECTRIFICATION IN THE AMAZON - CASE STUDY OF SURINAM

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# Overview

# The rural Amazon region is one of the regions in South America with the lowest rate of access to clean, universal, reliable, modern and affordable energy services. This situation is due to the characteristics its human rural occupations, the relatively large dispersion of human communities across an immense territory and the geophysical characteristics of the territory itself. However, the region has a significant potential for renewable energy from solar, wind, hydraulic and biomass. Paradoxically, the rural area of the Amazon exports clean electrical energy coming from dozens of large hydroelectric plants to the large cities and consumer centers in the region and also outside the Amazon. Rural electrification planning can be done with geospatial tools using a georeferenced database organized in a geographic information system with population distribution, current infrastructure for generation, transmission and distribution of electricity, communities’ socio-economic characteristics, in addition to environmental and geophysical data. There are two open-source and open-data geospatial tools that can be used for this planning. The Energy Access Explorer (EAE) is an interactive geospatial platform that permits the identification of priority areas for energy access interventions. This platform uses spatial multi-criteria analysis to identify these priority areas. Complementing the EAE, the Open Source Spatial Electrification Tool (OnSSET) is a geospatial tool developed to identify the least-cost electrification options for rural communities, choosing between the options of extending the distribution grid, installing mini grids with decentralized generation or individual household installations with different energy sources. This work presents a case study of Suriname, an Amazonian country with over 620 thousand inhabitants and 13% of the people living in the Amazon rainforest without access to regular electricity services. EAE was used to identify priority areas for the installation of rural electrification projects in this interior area and OnSSET was used to estimate the most cost-effective electrification option (grid, mini grid & stand-alone) for the achievement of electricity access goals of these priority areas.

**Methods**

A georeferenced dataset with the country’s electricity infrastructure, population distribution, rural villages and settlements, renewable energy potentials was organized was used as input for EAE and OnSSET. A set of criteria was defined within EAE to identify the priority areas and OnSSET used open reference data for grid extension, mini grid and stand alone, together with fuel, transport and electricity cost to calculate the Levelized Cost of Electricity for each population cluster.

# Results

# The result of this case study showed that the EAE was able to identify priority areas and communities based on a set of spatial and service criteria, and one of the main policy insights is that the methodology can be used as a priority selection tool for public policy and decision making and so decrease the influences of politics. Based on this prioritization, OnSSET calculated the leveled energy cost for the various service options in these regions.

**Conclusions**

This bottom-up methodology used in EAE and OnSSET for Suriname can be used for other regions with the same population densities and geographic occupation patterns in the Amazon.